

d) REMARKS

The claims are 1, 4-19, 24 and 25 with claims 1, 4, 12, and 25 being independent. The claims have been amended to better define the intended invention and reconsideration thereof is expressly requested.

Support for new claim 25 is found, inter alia, on page 13, line 23 to page 15, line 10.

Support for employing a partially hydrolyzed silicon compound or silicon alkoxide is found, inter alia, on page 2, lines 1-3 and 19-22; page 11, lines 11-17; page 18, lines 1-12 and page 29, lines 1-12. On page 2, lines 1-3 the phrase "hydrolyzing silicon alkoxides" is present. The "Chemical Communications" article on page 2, lines 18-22 teaches on page 1149 thereof a sol-gel process in which tetramethoxysilane (TMOS) is partially hydrolyzed by water under acidic conditions and treated with a surfactant to form the desired mesostructures. On pages 11, 18 and 29 of the instant specification it is disclosed that a silicon alkoxide (as TMOS or TEOS) forms a silica sol solution at an acid pH and a surfactant is added. Clearly, this results in a partially hydrolyzed silicon compound.

The specification has been amended at page 1, lines 5-8 to correct a grammatical error. Claim 1 has been amended pursuant to the Examiner's helpful suggestion.

Claims 1, 2, 4, 5, 7, 9-13, 15 and 17-24 were rejected as obvious over Bruinsma '299 in view of Miyata. The balance of the claims were rejected over the same combination and further over tertiary references. The Examiner admits Bruinsma fails to teach, inter alia, a substrate with alignment control ability and an uniaxially aligned

channel structure parallel to the substrate. Miyata is said to teach forming mesoporous silica particles in a sealed vessel at 80°C for one week by mixing silicon alkoxide and surfactants at acidic conditions. After the mesoporous particles are formed, the sample is washed and dried. The grounds of rejection are respectfully traversed.

Prior to addressing the grounds of rejection Applicant wishes to briefly review certain key features and advantages of the present claimed invention. The present invention relates to a method of manufacturing a material by, inter alia, contacting a solution containing a partially hydrolyzed silicon compound with a substrate having alignment control ability, and drying the substrate.

By employing a partially hydrolyzed starting compound, the rate of partially hydrolysis of the hydrolyzed compound is enhanced. Further, the condensation polymerization step conducted after hydrolysis, is also enhanced to obtain the material aligned by the influence of the substrate. The uniaxially aligned material is ultimately formed by drying the coated substrate, not by contacting the substrate with a coating solution for a prolonged time. The instant coating and drying process rapidly forms the desired mesostructure.

Bruinsma relates to a method of manufacturing a porous silicon in which the material can be simply manufactured by rapidly drying. Bruinsma teaches that the solution containing the completely hydrolyzed compound is coated on a substrate. See Col. 18, lines 50-52 "after TEOS hydrolysis the solutions were aged before coating." In Col. 8, lines 49-53, it is disclosed that the surfactant was added after hydrolysis. In contrast, the surfactant is present during completion of hydrolysis in the present invention.

Bruinsma has no disclosure or appreciation concerning forming an aligned material as in the present invention.

In Miyata the aligned material is obtained by immersing a substrate having alignment control ability in a solution containing silicon. However, the aligned material is manufactured directly in the solution. In contrast, in the present invention, the aligned material is formed on drying.

The Examiner contends that the present invention may be duplicated by applying a substrate having alignment control ability as in Miyata to the method in Bruinsma. However, in Bruinsma, the silicon compound employed is completely hydrolyzed. Only the condensation polymerization reaction, which forms the material from the compound, is performed on the substrate. Therefore, in Bruinsma, since the condensation polymerization is rapidly performed on the substrate, the material is manufactured without sufficient influence of the alignment control ability of the substrate.

In contrast, in the present claimed invention, the condensation polymerization rate is controlled by using a solution containing a partially hydrolyzed compound, whereby a reaction rate is provided to allow enhanced alignment control to be exerted by the substrate.

MacDougall merely discloses that a substrate is coated. However, this reference has no disclosure concerning formation of the desired aligned structure during the drying step. Therefore, the present claimed invention is not rendered obvious by combining MacDougall and Bruinsma.

The claims should be allowed and the case passed to issue.

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Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Attorney for Applicant

Registration No. 24947

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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